



PATENT

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: )  
)  
Chien et al. )  
)  
Application No: 10/840,056 )  
)  
Filed: May 5, 2004 )  
)  
For: COOLING FIN STRUCTURE AND FIN )  
ASSEMBLY )

Docket No: JLINP181/TLC

Group Art Unit: 3753

Examiner: Leo, Leonard R.

Date: December 15, 2006

## CERTIFICATE OF MAILING

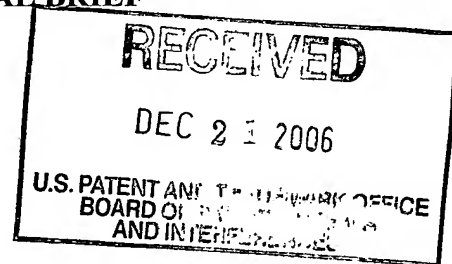
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Signed: \_\_\_\_\_

Kay Harlow

## TRANSMITTAL OF APPEAL BRIEF

Commissioner for Patents  
Box: Board of Patent Appeals & Interferences  
Alexandria, VA 22313-1450



Sir:

This Appeal Brief is in furtherance of the Notice of Appeal filed in this case on November 9, 2006.

This application is on behalf of:

☐ Small Entity ☒ Large Entity

Pursuant to 37 CFR 1.17(f), the fee for filing the Appeal Brief is:

☐ \$250.00 (Small Entity) ☒ \$500.00 (Large Entity)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136 apply:

☐ Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

<u>Months</u>	<u>Large Entity</u>	<u>Small Entity</u>
<input type="checkbox"/> one	\$120.00	\$60.00
<input type="checkbox"/> two	\$450.00	\$225.00
<input type="checkbox"/> three	\$1,020.00	\$_____
<input type="checkbox"/> four	\$1,590.00	\$795.00

If an additional extension of time is required, please consider this a petition therefor.

☐ An extension for \_\_\_\_\_ months has already been secured and the fee paid therefor of \$\_\_ is deducted from the total fee due for the total months of extension now requested.

☒ Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition and fee for extension of time.


**Total Fees Due:**

Notice of Appeal Fee	<u>\$500.00</u>
Extension Fee (if any)	<u>\$_.00</u>
<b>Total Fee Due</b>	<b><u>\$500.00</u></b>

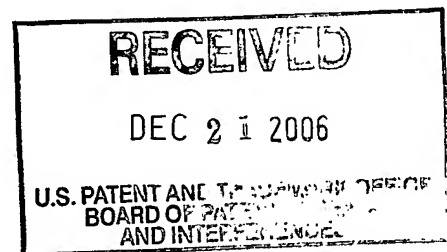
☒ Enclosed is Check No. 17481 in the amount of \$500.00.

☒ Charge any additional fees or credit any overpayment to Deposit Account No. 50-0850, (Order No. JLINP181/TLC). A copy is enclosed.

Respectfully submitted,  
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Application No. 10/840,056

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

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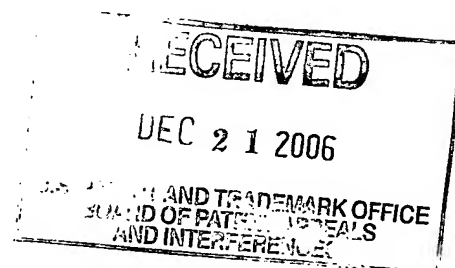
**EX PARTE Chien et al.**

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**Application for Patent**

**Filed: May 5, 2004**

**Application No. 10/840,056**



**FOR:**

**COOLING FIN STRUCTURE AND FIN ASSEMBLY**

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**APPEAL BRIEF**

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**CERTIFICATE OF MAILING**

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Signed: \_\_\_\_\_

*Kay Harlow*  
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## REAL PARTY IN INTEREST

The real party in interest is Delta Electronics, Inc., the assignee of the present application.

## II. RELATED APPEALS AND INTERFERENCES

The undersigned is not aware of any related appeals and/or interferences.

## III. STATUS OF THE CLAIMS

A total of 19 claims were presented during prosecution of this application. Claims 4-6 and 15-17 were withdrawn. The Applicants appeal rejected Claims 1-3, 7-14, 18 and 19.

## IV. STATUS OF THE AMENDMENTS

All amendments have been entered, leaving finally rejected Claims 1-3, 7-14, 18 and 19, which are the appealed claims.

## V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Broadly speaking, the claimed invention provide a cooling fin structure and a fin assembly capable of reducing thermal contact resistance while maintaining the stability in the welding process during fabrication. A cooling fin structure is constructed by a thermally conductive sheet bent to form a heat radiation part and a welding part. The welding part is formed with a vacant region, which is defined by notches, openings or a slot, and the thermally conductive sheet is welded to a substrate through the welding part.

**Independent claim 1** defines a cooling fin structure (12) connected to a substrate (16) with a solder. (See, Specification, pages 4-6). The cooling fin structure (12) includes at least one thermally conductive sheet. Each of the thermally conductive sheets

is bent to form a heat radiation part (12a) and a bonding part (12b). The bonding part has a flat surface in contact with the substrate and is formed with a vacant region (e.g., 16a, 22, and 24). The solder is disposed between the substrate (16) and the bonding part (12b), and the vacant region (e.g., 16a, 22, and 24) exposes the squeezed solder underneath. (See paragraph [0019], [0020], [0022])

Dependent claim 2, defines the vacant region as notches formed on an edge of the bonding part. (See Figures 2A).

Dependent claim 3, defines the bonding part having a serrate edge. (See Figures 2A, 2B, and 2C).

Dependent claim 10, defines the thermally conductive sheet being bent to form an L-shape cross-section. (see Figure 2A and 2B).

**Independent claim 11** defines a fin assembly (10). The fin assembly includes a substrate (16) and a plurality of cooling fins (12). (Specification, pages 4-6) Each of the plurality of cooling fins is bent towards one direction to form a heat radiation part (12a) and a bonding part (12b). The bonding part (12b) has a flat surface soldered on a surface of the substrate (16) to connect the cooling fins (12) to the substrate (16). (See, Specification, pages 4-6). The bonding part (12b) is formed with a vacant region (e.g., 16a, 22, and 24) such that part area of the surface of the substrate (16) between adjacent two of the cooling fins (12) is not covered by the cooling fins. (See paragraph [0019], [0020], [0022])

Dependent claim 13 defines the cooling fin bent to form an L-shape cross-section. (see Figure 2A and 2B).

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

- A. Claim 1 stands improperly rejected under 35 U.S.C. 102(b).
- B. Claim 11 stands improperly rejected under 35 U.S.C. 102(b).
- C. Claims 2 and 3 stand improperly rejected under 35 U.S.C. 102(b).
- D. Claims 10 and 13 stand improperly rejected under 35 U.S.C. 102(b).

## VII. ARGUMENT

- A. **The claimed invention of independent claim 1 is not anticipated by Ito. (US. Pat. No. 5,558,155).**

Claim 1 was rejected under 35 USC § 102(b), as anticipated by Ito. The Office's position, as noted in the Final Office Action of August 9, 2006, is that Ito teaches each and every limitation of claim 1, based on the teachings of Figures 5A, 6 and 9.

### **The Claim language:**

Language of Claim 1:

A cooling fin structure connected to a substrate with a solder, the cooling fin structure comprising:  
at least one thermally conductive sheet, each of the thermally conductive sheets being bent to form a heat radiation part and a bonding part, the bonding part having a flat surface in contact with the substrate and being formed with a vacant region;  
wherein the solder is disposed between the substrate and the bonding part, and the vacant region exposes the squeezed solder underneath. (emphasis by Applicant)

The Office points to concave sections 18g and 19g, as support for teaching "a **bonding part** having a *flat surface* in contact with the substrate and is formed *with a vacant region.*" As claimed, the flat surfaces has a vacant region, meaning there is nothing in the vacant region. The concave sections 18g and 19b form V-shaped sections, which cap or house a region, which the Office asserts is vacant. The Applicant refers the Board

to Col. 6, lines 37-41, which specifically states that brazing material is collected in the V-shaped sections 18g, "...which prevents the brazing material from flowing out to the outside.

Based on the teachings of Ito, the V-shaped sections are functionally provided to collect the brazing material inside of the V-sections. In contrast to what is claimed, the vacant regions are part of the flat surface, and the vacant regions are not covered by a V-shape cap,... as they are claimed to be vacant and formed in the flat surface of the bonding part. Even if the V-shape cap 18g were to define a vacant region, a proposition with the Applicant disagrees with, the V-shaped cap 18g is not part of a *flat surface* that is in contact with the substrate and is formed with a vacant region. To the contrary, the flat portion of Ito is one part, and the V-shaped cap 18g is another part, which is not part of the flat surface. Further, Ito's V-shaped cap cannot expose the squeezed solder underneath, thereby resulting in a large amount of welding flux left on the welding area between the fin and the substrate, like the prior art mentioned in Figure 1C of the present application.

It is noted that Ito defines pairs of spread apart notches, but those notches are mating notches. The notches are shown in Figure 2 and others. It is submitted that mating of notches would not provide for a vacant region, as claimed. For this reason, it is assumed that the Office choose to rely on the V-shape regions 18g and 19g of Figures 6 and 9.

In view of the foregoing, it is respectfully submitted that claim 1 is not anticipated by Ito, and the Applicant respectfully requests the Board to reverse the Examiner on this rejection.



**B. The claimed invention of independent claim 11 is not anticipated by Ito. (US. Pat. No. 5,558,155).**

Claim 11 was rejected under 35 USC § 102(b), as anticipated by Ito. The Office's position, as noted in the Final Office Action of August 9, 2006, is that Ito teaches each and every limitation of claim 11, based on the teachings of Figures 5A, 6 and 9.

**The Claim language:**

Language of Claim 11.

A fin assembly, comprising:  
a substrate; and  
a plurality of cooling fins, each of which being bent towards one direction to form a heat radiation part and a bonding part, the bonding part having a flat surface soldered on a surface of the substrate to connect the cooling fins to the substrate;  
wherein the bonding part is formed with a vacant region such that part area of the surface of the substrate between adjacent two of the cooling fins is not covered by the cooling fins. (emphasis by Applicant)

The Argument provided with regard to claim 1 in Section A above is incorporated herein. Additionally, the Board is respectfully directed to the claim language, which specifically further defines the vacant region. In the claim language itself, it is defined that the area of the substrate between two adjacent cooling fins "*is not covered*" by the cooling fins. It is submitted that patentable weight was not provided to this claim limitation during prosecution, as the Examiner has failed to address this limitation in the rejection, but instead provided a blanket rejection to all claims.

It is again stated that the Applicant's position is that a vacant region is not defined by V-sections 18g. But further, even if the V-sections 18g were read to be "vacant", they are positively providing a "cover" over the surface. This is contrary to what is claimed. Again citing to col. 6, lines 37-41, Ito states that the V-shaped sections 18g is provided

near the two edge sections, and the purpose of the V-shaped sections 18g is to "collect" material. The material is collected near the two edges to "prevent" material from flowing out to the outside.

The Board's attention is also brought to the fact that *preventing* material from flowing is **contrary to the purpose of the vacant region**, as claimed. Ito is attempting to prevent the flow of brazing material, and only at the two ends of the fin. Not only is Ito only providing two very spread apart V-shaped regions 18g, but Ito's purpose of providing the capping of the V-shape is to collect the brazing material and thwart the flow of brazing material from under its flat surface. Consequently, Ito, even if combined with other art, could not obviously suggest the claimed invention, as its teachings would motivate one of skill in the art from providing one or more vacant regions that would freely allow flow.

For reference, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. MPEP §2143.01. The test for obviousness is what the combined teachings of the references would have suggested to one of ordinary skill in the art. MPEP §2143.01 As noted above, Ito could not be combined with other art, as Ito would motivate one of skill in the art to do the opposite of what is claimed.

In view of the foregoing, it is respectfully submitted that claim 11 is not anticipated by Ito, and the Applicant respectfully requests the Board to reverse the Examiner on this rejection.

**C. The claimed invention of dependent claims 2 and 3 are not anticipated by Ito. (US. Pat. No. 5,558,155).**

Claims 2 and 3 define further aspects of the vacant region, of claim 1. It is submitted that the Office has not given claims 2 and 3 independent weight, nor complete rational for their rejection.

Specifically, claim 2 defines the vacant region as notches formed on an edge of the bonding part. The Examiner, in the Office Action of August 9, 2006, simply refers to the notches of 18g and 19g. As noted above, the 18g and 19g are raised capping V-shaped structures. These V-shaped structures are only defined on the ends of the fins (See col. 6).

Claim 3 defines the bonding part having a serrate edge. As noted in response to the Final Office Action of March 6, 2006, the Serrate edge could look like teeth of saw. The Examiner asserts that Figs. 6 and 9 of Ito discloses notches 18g and 19g, respectively, which is read as defining a "serrate edge". By definition (i.e. Encarta Dictionary), a serrate edge should look like teeth (plural) of saw. That is, a serrate edge should have a series of continuous notches thereof. Ito merely discloses two discontinuous notches, which do not adequately anticipate a serrate edge, as recited in claim 3. It is respectfully submitted that the Office's assertion that the term "serrate" is met by pointing to items 18g and 19g, is lacking in both fact and objective rational. In the Final Office Action of August 9, 2006, the Examiner indicated that he would not give this term additional patentable weight, as lacking patentability. The Applicant respectfully disagrees with the Examiner's rational, and the Board is reminded that the current rejection of claim 3 is under 35 USC § 102(b), and each element of the claim must be found in the reference in order to properly sustain a rejection of anticipation.

In view of the foregoing, it is respectfully submitted that claims 2 and 3 are not anticipated by Ito, and the Applicant respectfully requests the Board to reverse the Examiner on this rejection.

**D. The claimed invention of dependent claims 10 and 13 are not anticipated by Ito. (US. Pat. No. 5,558,155).**

Claims 10 and 13 were also rejected, as being anticipated by Ito. This rejection is respectfully traversed. Claims 10 and 13 define that the thermally conductive sheet is bent to form an L-shape cross-section. (see Figure 2A and 2B). The teachings of Ito specifically recite either bracket shapes "]" or "Z" shapes, as disclosed throughout the specification. Based on Ito's teachings, the shapes of the fins are defined so they can form a top surface, which can then support components. (See Figure 1 of Ito). Nowhere does Ito teach an "L" shape, as claimed in dependent claims 10 and 13. The Office does not specifically inform the Applicant where the "L" shape is found in Ito, but simply rejects the claims as being anticipated.

In an Examiner Conference of September 25, 2006 (See Conclusion), the Examiner indicated that the "L" shape was specifically taught by the Z shape or "]" bracket of Ito, as an "L" could be part of the Ito's fin, and as a backup, the Examiner indicated that claims 10 and 13 were anticipated because we have a "comprising" transition in each of the independent claims, which makes the claim open ended. The Applicants disagree on both counts. Firstly, the "L" shape is just that, an "L" shape. Even if an "L" could be drawn from a portion of a "]" bracket shape, the bracket does not teach an "L". Secondly, the limitations of claim 13 seek to limit the shape of the fins, as claimed. Although other components or features could be present, based on the "comprising" transition, the fin shape is still limited to the "L" shape, based on the limitation defined by claims 10 and 13. For this reason, it is submitted that the Examiner's rational for insisting that claims 10 and 13 are anticipated by Ito are lacking in fact and/or faulty rational. As stated by the Court of Appeals for the Federal Circuit,

a rejection must be supported by logical rational or reasoning.

For this reason alone, the Board is respectfully submitted to overturn the Examiner's rejection of dependent claims 10 and 13, and provides an indication of allowability over Ito, as the Examiner confirmed that no further search was needed, even after the Applicant filed an RCE. (See Conclusion for Examiner Conference Summary).

#### **E. Conclusion**

As the rejections from which the Applicants appeal are based on Section 102, it is submitted that the standard for lack of novelty (i.e., "anticipation") under 35 U.S.C. 102 is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. *See, e.g., Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 U.S.P.Q. 81, 90 (Fed. Cir. 1986). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

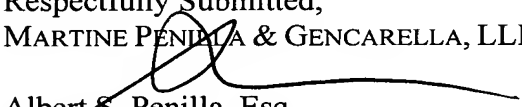
An Examiner Conference was had on September 25, 2006, and discussion was had regarding the rejections, procedures taken to issue a *first action final* upon filing of an RCE, and the Applicant's interpretation of the claim terms. The specific limitations of claims 1, 2, 3, 10, 11, and 13 were discussed, in an effort to expedite prosecution. No agreement was reached, as the Examiner strongly believes that Ito anticipates each of

claims 1, 2, 3, 10, 11, and 13. In the Conference, the Examiner further confirmed that based on the Offices' position, no further search was needed when the RCE was filed (*although such fee pays for an additional search*), the amendments were entered for appeal, and the Applicant was invited to present the issues to the Board for consideration. As no further search was needed, the Board is respectfully requested to opine on the issues presented herein, without re-opening prosecution.

The Applicants respectfully request that the Board consider each argument for the claims in arguments A, B, C, and D separately. The Applicants further respectfully request that the Board consider the elements of each claim as a whole relative to the teachings of the cited art.

The Applicant submits that the rejections are in error, and respectfully request that the Board of Appeals and Interferences reverse the Examiner's rejections of the claims on appeal.

Respectfully Submitted,  
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III.

## CLAIMS APPENDIX

Claim 1. A cooling fin structure connected to a substrate with a solder, the cooling fin structure comprising:

at least one thermally conductive sheet, each of the thermally conductive sheets being bent to form a heat radiation part and a bonding part, the bonding part having a flat surface in contact with the substrate and being formed with a vacant region;

wherein the solder is disposed between the substrate and the bonding part, and the vacant region exposes the squeezed solder underneath.

Claim 2. The cooling fin structure of claim 1, wherein the vacant region is defined by notches formed on an edge of the bonding part.

Claim 3. The cooling fin structure of claim 1, wherein the bonding part has a serrate edge.

Claim 4 (withdrawn)

Claim 5 (withdrawn)

Claim 6 (withdrawn)

Claim 7. The cooling fin structure of claim 1, wherein the material of the thermally conductive sheet is selected from the group consisting of aluminum, copper, aluminum alloy, copper alloy, and their compounds.

Claim 8. The cooling fin structure of claim 1, wherein the material of the substrate is selected from the group consisting of aluminum, copper, aluminum alloy, copper alloy, and their compounds.

Claim 9. The cooling fin structure of claim 1, wherein the thermally conductive sheet is bent through sheet metal work.

Claim 10. The cooling fin structure of claim 1, wherein the thermally conductive sheet is bent to form an L-shape cross-section.

Claim 11. A fin assembly, comprising:  
a substrate; and

a plurality of cooling fins, each of which being bent towards one direction to form a heat radiation part and a bonding part, the bonding part having a flat surface soldered on a surface of the substrate to connect the cooling fins to the substrate;

wherein the bonding part is formed with a vacant region such that part area of the surface of the substrate between adjacent two of the cooling fins is not covered by the cooling fins.

Claim 12. The fin assembly of claim 11, wherein the cooling fin is bent through sheet metal work.

Claim 13. The fin assembly of claim 11, wherein the cooling fin is bent to form an L-shape cross-section.

Claim 14. The fin assembly of claim 11, wherein the vacant region is defined by notches formed on an edge of the bonding part.

Claim 15 (withdrawn)

Claim 16 (withdrawn)

Claim 17 (withdrawn)

Claim 18. The fin assembly of claim 11, wherein the thermally conductive material is selected from the group consisting of aluminum, copper, aluminum alloy, copper alloy, and their compounds.



Claim 19. The fin assembly of claim 11, wherein the material of the cooling fin is selected from the group consisting of aluminum, copper, aluminum alloy, copper alloy, and their compounds.

**IX. EVIDENCE APPENDIX**

There is currently no evidence entered and relied upon in this Appeal.

**X. RELATED PROCEEDINGS APPENDIX**

There are currently no decisions rendered by a court or the Board in any proceeding identified in the Related Appeals and Interferences section.